Pure Appl. Geophys. 168 (2011), 949–950

DOI 10.1007/s00024-010-0183-0

Pure and Applied Geophysics

Book Review

Geodetic and Geophysical Observations in Antarctica: An Overview in the IPY Perspective, by Allesandro Capra, Reinhard Dietrich (eds), Springer, 2008; ISBN: 978-3-540-74881-6

Marek Lewandowski[1]

This book is a set of 20 research articles written by 80 authors from 12 countries. The editors, Allesandro Capra of the University of Modena and Reggio Emilia (Italy) and Reinhard Dietrich of the GeoForschungsCentrum (Potsdam, Germany), are experienced researchers and members of several expeditions to Antarctica. They successfully guided and edited this book, which may be considered an important step in discovery and better recognition of the continent.

In order to gain a better understanding of the Antarctic environment, long time series as recorded by permanent observatories should be integrated together with data acquired by field surveys such as geological and glaciological sampling, geophysical investigations, and with satellite data. Selection of papers for this volume is clearly tied to this philosophy. The book is intended to give an overview on all aspects of the scientific utilization of geodetic–geophysical observations in Antarctica, of data analysis and geodynamic interpretation as well as of the various technological aspects in setting up autonomous observatories in Antarctica. The International Polar Year presented a good opportunity for the compilation of the current state-of-the-art in this field, and the editors made the most of it.

Subsequent articles, in a concise but sufficiently informative style, deal with issues of different scale and importance. The topics and their significance are sometimes interlaced at random and, to my taste, the papers could be arranged in a more logical manner, passing from the general to more specific topics. However, since each paper is rather an independent item in the sense of the region and subjects, their sequence in the book is, perhaps, not so crucial. The book starts with presentation of GPS results determining horizontal velocity of the Antarctic plate. The following papers present technologies to operate year-round remote global navigation satellite system stations in extreme environments; geodetic Italian-made infrastructure of Northern Victoria Land and its contribution to geosciences investigations in the polar remote areas; satellite-based communications systems designed for these areas; current status and future prospects for the Australian Antarctic geodetic network; geodetic research on Deception and South Shetland Islands, the Bransfield Sea and the Antarctic Peninsula during the last 20 years of the Spanish Antarctic campaigns; results of re-evaluation of the precipitable water over Antarctica from observations taken at the coastal Antarctic GPS stations; GPS-based geodynamic interpretation of the tectonic detachment in the Penola Strait (Antarctic Peninsula) envisaged by Ukrainian researchers; results of analysis of a 6-year set of continuous GPS observations focused on the water vapor content and its variation with time in the area of Terra Nova Bay (Northern Victoria Land); the influence of the surrounding ground conditions on multipath effects of Global Navigation Satellite System antennas, as well as the impact of snow cover on antennas; results of the atmospheric impact on GNSS observations; a validation of the ocean tide models around Antarctica using GPS measurements; results of gravity field measurements by means of superconducting gravimeter; discussion on measurements of sea level with a novel

[1] Institute of Geological Sciences, Polish Academy of Sciences, Twarda 51/55, 00-818 Warszawa, Poland. E-mail: lemar@twarda.pan.pl

technique based on a GPS equipped buoy to achieve an in situ calibration of a tide gauge, currently adopted by the Australian Government Antarctic Division; application of the tidal gravimetry technique to the polar, ice-covered seas as a complementary tool to continuous GPS measurements; results of joint geophysical observations of the ice stream dynamics; state-of-the-art and a perspective view in the global and regional framework of the geomagnetic observatories in Antarctica; discussion on the tectonic setting and geodynamic origin of East Antarctica based on gravity, magnetic and airborne radar datasets acquired along the regional geotraverse crossing the Wilkes Basin lithosphere; effects of the photogrammetric research conducted at the Antarctic station "Academician Vernadskyy"; and last, but not least, the contribution of Russian geodesists and topographers to Antarctic mapping.

The book will be interesting to all geoscientists active in polar regions as well as to graduate students in geophysics and geodesy for the many methodological aspects touched upon by the authors.